

This is a review and discussion of the 2013 status update for snook (*Centropomus undecimalis*) conducted by the Fish and Wildlife Research Institute (FWRI). The Florida Fish and Wildlife Conservation Commission (Commission) is the primary managing agency for snook in Florida. The status update includes data from 1986 through 2012. The most recent snook assessment was completed in 2010, with an assessment update completed in 2012. Snook are targeted by recreational anglers in Florida for food and sport.

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Current Snook Management

- **Management Goal:** 40% SPR
- **Spawning Potential Ratio:** SPR compares the spawning ability of a stock in the fished condition to the stock's spawning ability in the unfished condition
- Atlantic and Gulf stocks managed and assessed separately
- Extreme cold temperatures in early 2010 resulted in closures for both coasts



The snook fishery has been managed with a goal of 40% spawning potential ratio (SPR) since 1994. SPR compares the spawning ability of a stock in the fished condition to the stock's spawning ability in the unfished condition. More specifically, SPR is the number of eggs that could be produced by a fish over its lifetime incorporating fishing mortality divided by the number of eggs it could produce if there were no fishing mortality.

Research by FWRI scientists indicates snook on the Atlantic and Gulf coasts are two distinct stocks. The Commission manages these stocks separately, and this status update examines the Atlantic and Gulf stocks separately as well.

The purpose of this presentation is to give an update on the status of the snook stocks after the closures resulting from the extreme cold weather event in 2010.

Current Snook Regulations

Statewide

- **Allowable Gear:** Hook and line
- **Bag Limit:** 1 per harvester per day
- Snook permit required
- No commercial harvest



Gulf

- **Slot Limit:** 28 – 33 inches
- **Closed Season:** Dec. 1 – end of Feb., May 1 – Aug. 31
- **Executive Order:** Catch-and-release only through Aug. 31, 2013
- Closed since January 2010

Atlantic

- **Slot Limit:** 28 – 32 inches
- **Closed Season:** Dec. 15 – Jan. 31, June 1 – Aug. 31



Snook are regulated through the Commission's rules in 68B-21, Florida Administrative Code (FAC). The only allowable gear for the harvest of snook statewide is hook and line. There is a bag limit of one snook per harvester per day, and anglers who harvest snook in Florida must have a snook permit in addition to a recreational saltwater fishing license, unless otherwise exempted. Snook is a recreational fishery in Florida, with commercial harvest and sale prohibited since 1985.

The Gulf of Mexico stock is currently closed to all harvest, due to the negative effects of the severe cold weather in 2010 that caused a decline in the Gulf stock. When the fishery is open, snook must be between 28 to 33 inches to be harvested from the Gulf region. During a regular year, the harvest of snook in the Gulf is prohibited from December 1 through the end of February and from May 1 through August 31. The current year-round closure was implemented on January 16, 2010, via an executive order (EO) and is in effect until August 31, 2013.

The impacts of the extreme cold weather in 2010 were less severe on the Atlantic coast, where snook seasons returned to the previously established season schedule in 2011. The regular Atlantic closed seasons are from December 15 through January 31 and June 1 through August 31. The recreational slot limit in the Atlantic Ocean is 28 to 32 inches.

2010 Extreme Cold Temperature Effects

- **Juveniles:**
 - Low catch rates statewide in 2010 suggested a drop in snook abundance
- **Adults:**
 - **Atlantic:** 2010 catch rates were similar to catch rates in previous years
 - **Gulf:** 2010 catch rates showed a drop in snook abundance during the first half of 2010
- Snook on the Gulf were more severely impacted by the extreme cold temperatures than the Atlantic



FWRI conducted a stock assessment update of the Gulf of Mexico and Atlantic snook stocks in 2012 in order to characterize the impacts of the 2010 extreme cold weather event. The effect of the 2010 cold temperatures on juvenile snook in south Florida was assessed by reviewing annual indices of abundance generated from fishery independent surveys in Tampa Bay, Charlotte Harbor, and the northern and southern portions of the Indian River Lagoon during the last 13 years. In general, haul seine surveys caught fewer juvenile snook in 2010 than in previous years in each of the four estuaries evaluated (although lower abundance levels in 2010 were only statistically significant for the northern Indian River Lagoon and Tampa Bay).

Recreational fisheries data suggested adult snook in different parts of Florida were impacted differently by the extreme weather. On the Atlantic coast, 2010 Marine Recreational Fishing Statistical Survey (MRFSS) catch rates were level with catch rates for the same time period over the past few years, suggesting a small impact from the extreme cold temperature on adult, legal-sized snook in 2010. MRFSS catch rates from the Gulf were more variable, but in general showed a proportionally larger drop than the Atlantic in snook abundance during the first half of 2010, suggesting snook in the Gulf were more severely impacted by the extreme cold temperatures than Atlantic snook.

Management Response to Extreme Cold Temperatures in 2010

2010

- Statewide closure Jan. 2010 through Sept. 2010
- Commission open Atlantic from Sept. 17 through Dec. 15
- Statewide closure until Aug. 31, 2011

2011

- Atlantic fishery re-opened on Sept. 1
- Commission extended Gulf closure until Aug. 31, 2012

2012

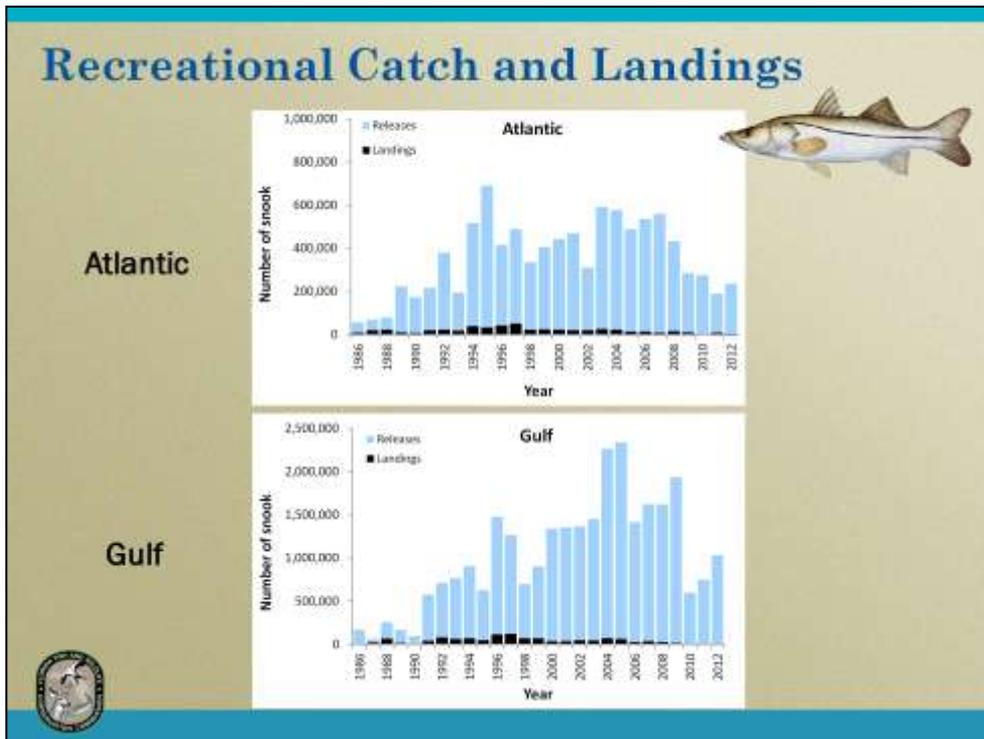
- Atlantic fishery remains open
- Gulf closure extended until Aug. 31, 2013



After the extreme cold temperature events of 2010, immediate action was taken with an executive order (EO)(10-03) that closed the fishery statewide from January 16, 2010, until August 31, 2010. In early August, the FWC issued a second EO (10-39) extending the statewide closure until September 16, 2010, to give the Commission adequate time to consider whether to keep the season closed for an extended period of time or reopen on September 17. In September 2010 the Commission decided to keep the Gulf coast closed for the remainder of 2010, but decided that the Atlantic stock had recovered enough to support a fall harvest and the fishery was reopened on September 17 for the fall of 2010. The Commission also decided to close both coasts January 1 through August 31, 2011, to protect snook during their spawning season. These closures were implemented through a third EO (10-45).

On September 1, 2011, the Atlantic fishery reopened and resumed the regular established season schedule. The Commission closed the Gulf for another year under EO (11-16) until August 31, 2012, based on its determination that the Gulf stock was more affected by the 2010 extreme cold temperatures. In June 2012, the Commission was presented with a stock assessment update. The Gulf stock was exceeding the Commission's 40% SPR management goal with an SPR of 56%. Similarly, the Atlantic stock was continuing to show improvement with an SPR of 34%, compared to an SPR value of 25% in 2006. However, it was evident in the spawning stock biomass data that the juvenile population on the Gulf had been negatively affected by the cold temperatures, despite the fact that it was not reflected in the SPR. Some members of the public felt that the Gulf stock needed more time to recover and the Commission agreed that it was best to take a precautionary approach and kept the fishery closed. The Gulf remains closed under an EO (12-11) that is set to expire August 31, 2013.

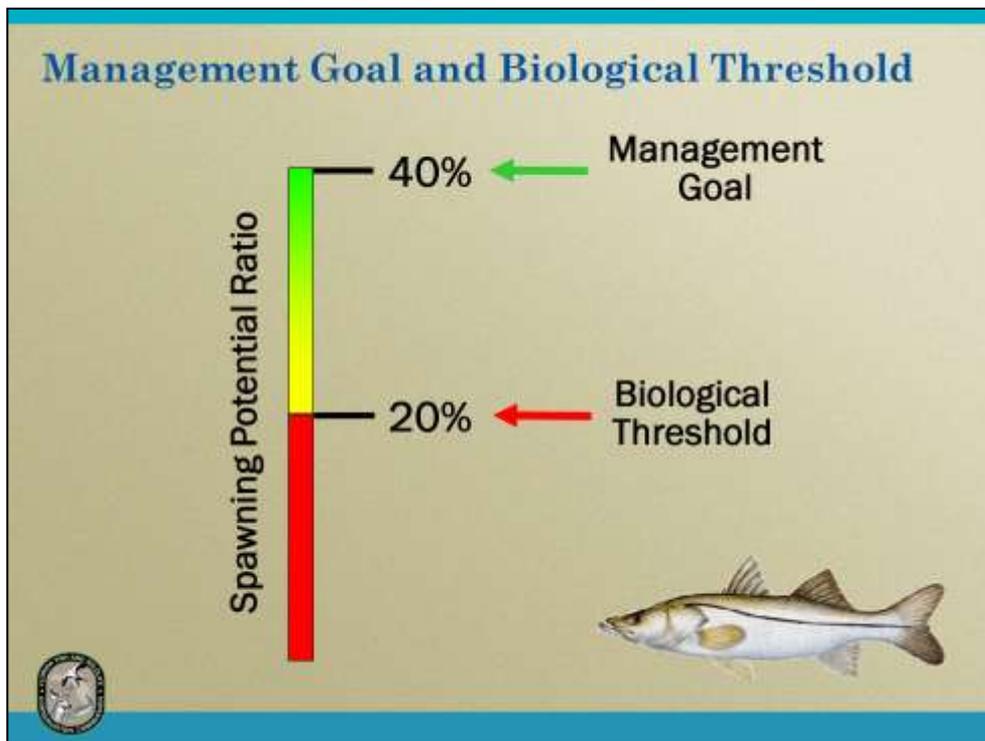
The following slides give a statewide update on the status of the snook stock.



These graphs show the recreational catch from 1981-2012, divided into fish that were caught and released (blue) and those that were landed (black). The data used in the 2013 status update were generated from the new Marine Recreational Information Program (MRIP). This is the first snook stock status update that has used MRIP data instead of MRFSS data. MRIP data are considered the best available data and staff has more confidence in the results of this 2013 status update using this new data collection program. The results from the previous 2012 stock assessment presented in June 2012 are slightly different because the data came from MRFSS instead of MRIP.

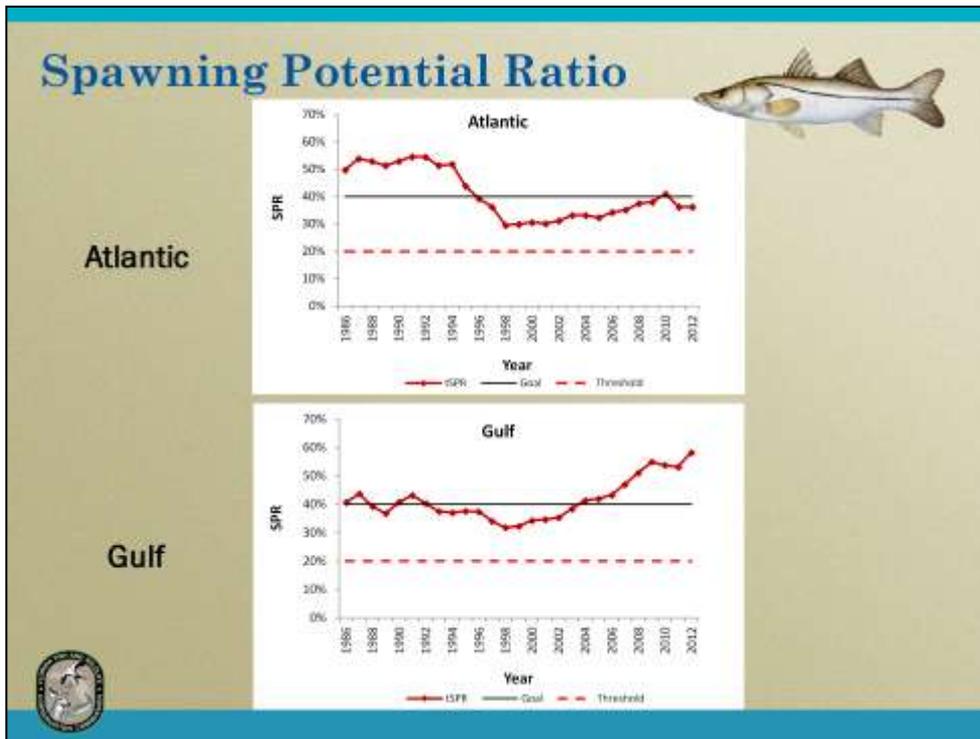
Angler interviews indicate recreational anglers in Florida release more than 90% of the snook they catch statewide, and since 2005, release more than 95%. In 2012, the total catch, including the number of fish released, was 236,377 snook on the Atlantic coast and 1,034,083 snook in the Gulf. In the Atlantic the total catch of snook peaked at 689,000 fish in 1995. In the Gulf, catch peaked at 2,348,000 fish in 2005.

Catch and release mortality has not been factored into these calculations.



This diagram shows the difference between the biological threshold and the Commission management goal for snook. The Commission manages snook for a goal of 40% SPR. Recent analyses by the Fish and Wildlife Research Institute (FWRI) indicate that the biological threshold for maintaining sustainable populations of snook is around 20% SPR. The threshold is a biological benchmark level that would indicate a decline in the stock over time and would require management action to correct the situation to prevent harm to the species' reproductive capacity.

The Marine Fisheries Commission set the management goal for snook at 40% SPR in 1994 in order to manage for more, larger fish in all waters off Florida. This goal was reaffirmed by the FWC in 2007 after extensive work with stakeholders.



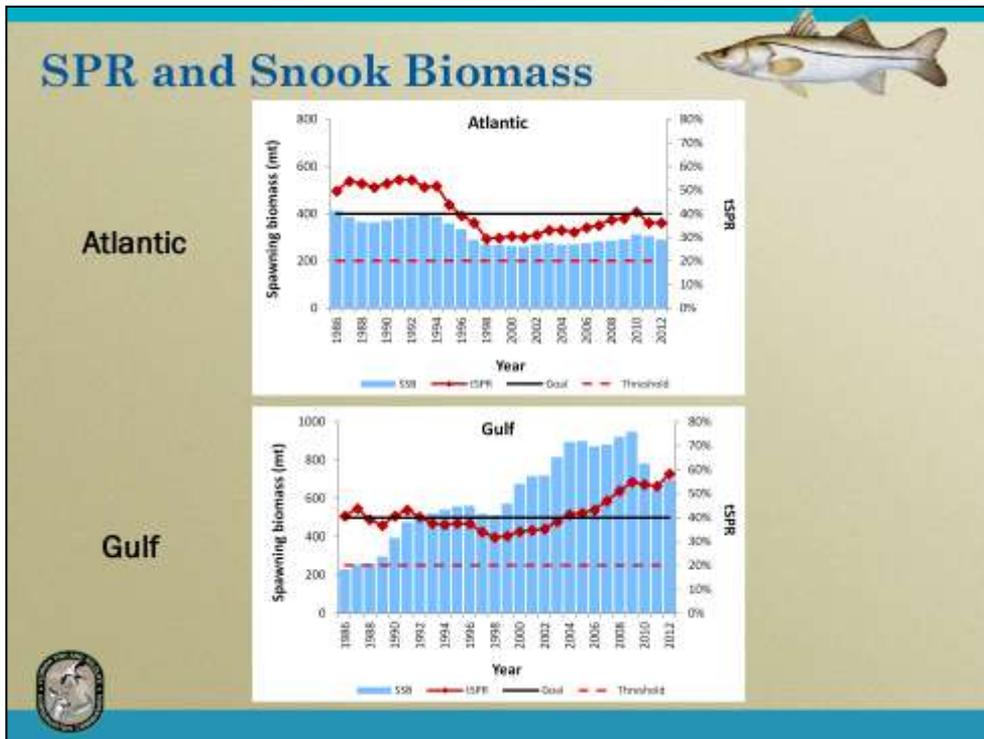
This slide shows the SPR values for snook from the 2013 stock status update on the Atlantic and Gulf coasts. The values on the graphs were generated using MRIP data. This is the first snook status update that has used MRIP data instead of MRFSS data, so the results differ slightly from those presented in June 2012.

According to the 2013 status update, the SPR values are increasing in the Atlantic and approaching the Commission’s management goal of 40% SPR. The latest SPR value in the 2013 status update was 36% compared to an SPR value of 25% in 2006. SPR values indicate that if fishing mortality rates continue at the 2012 level, snook should achieve the Commission’s goal on the Atlantic coast.

The SPR values from the 2013 status update indicate the Gulf stock is at 58%, which is well above the management goal of 40% SPR.

However, there are limitations to using SPR as the only metric for stock status. SPR calculates the effect of fishing mortality on a stock. Natural mortality events, such as red tides or extreme weather, are not directly revealed in SPR model results. Stocks that are more vulnerable to episodic environmental effects (such as extreme weather and red tides), like snook, should be assessed using additional information when possible.

Due to the Gulf snook stock’s vulnerability to these environmental impacts, a model that incorporated red tides and cold weather events was used for the Gulf. Since the SPR value from this model is still probably higher than reality, other metrics, such as spawning stock biomass (SSB) can give a better idea of the status of the Gulf snook stock after the extreme cold weather of 2010.



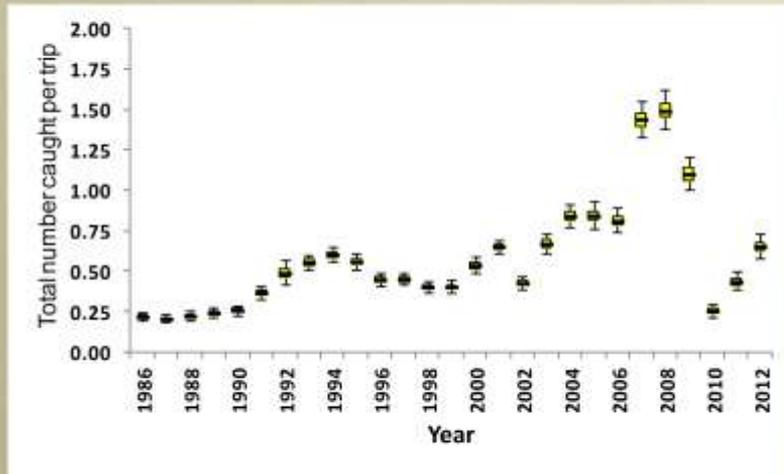
In order to determine whether the SPR values from the models run for the Atlantic and Gulf snook stocks are accurate for snook, spawning stock biomass (SSB) is compared to SPR on these graphs. SSB is the total weight of reproductive individuals in a population and reflects the impacts of natural mortality events better than SPR.

For the Atlantic stock, SSB follows the SPR trend, and both the SPR and the SSB have been stable over the last few years. This tells us that SPR is a reasonable metric to use for the Atlantic stock, where red tides and cold kills are less severe, and that the stock size remains stable.

In comparison, the Gulf SSB dropped significantly in 2010, and the SPR only dropped slightly. This illustrates how SPR is not able to properly represent the magnitude of the drop from the extreme cold temperatures. About 20% of SSB was lost due to the cold weather event in 2010. This dropped the Gulf stock back to its abundance level in 2003/2004.

However, in 2011 and 2012, on the Gulf coast, SSB follows the SPR trend, which shows that SPR can be used reliably as a metric for the status of the snook stock when considering snook management.

Everglades National Park



This graph shows average catch rates (i.e., the total number of snook caught per fishing trip) for common snook in Everglades National Park from 1986 through 2012. The box represents the 25th to 75th percentile, and the vertical line is the 95% confidence interval. This is the same type of summary analysis presented last year but updated to include data for the full year (i.e., data collected during January through December) instead of just data for the first semester (i.e., data collected during January through June).

Snook Status Update Summary



Atlantic

- SPR at 36%
- Approaching management goal at the current rate of effort and mortality

Gulf

- SPR at 58%
- SSB values confirm SPR values
- Adult biomass dropped 20% after cold temperatures in 2010
- Juveniles were more affected by extreme temperatures
 - Effects not fully realized for 5 years in adult spawning stock



In summary, the Atlantic stock is at 36% SPR and approaching the management goal. The stock should reach the goal if the current levels of fishing mortality and effort continue.

The Gulf stock was reduced by the extreme cold weather event of 2010; however, the SPR values do not reflect this reduction. However, in 2011 and 2012, on the Gulf coast, SSB follows the SPR trend, which shows that SPR can be used reliably as a metric for the status of the snook stock when considering snook management. According to the SSB, adult stock biomass dropped nearly 20% in 2010, and estuarine sampling showed that juvenile snook were more affected by the extreme temperatures, meaning the total effects of the cold weather on the spawning stock will not be realized for at least five more years. However, the stock is likely well above the biological threshold of 20% SPR, with the model showing an SPR of 58%, and the low fishing mortality rates provided by current management, including closed seasons and the slot limit that protects the remaining and new juveniles from harvest, should allow the stock to rebuild in a few years.

Staff Recommendation



Atlantic

- Maintain existing regulations for the Atlantic

Gulf

- Allow the existing EO to expire
- Maintain existing regulations
 - Snook would reopen Sept. 1, 2013
 - Stock above biological threshold, will continue to grow
 - Current slot limit will protect juveniles most affected by cold spell
- Next FWC assessment due in 2015 if no management changes are made
- Consider other metrics in addition to SPR to assess population



Based on the results of the 2013 status update, staff recommends maintaining the existing regulations for snook on the Atlantic Coast.

Staff also recommends allowing the EO to expire, which would open the Gulf to fishing for snook on September 1, 2013, under the existing regulations. The stock is likely well above the biological threshold and fishing mortality is low for this stock even when the season is open. Also, the current slot limit will protect juveniles that were affected in 2010, as well as the largest individuals in the population. Harvest has been prohibited for more than three and a half years, and extending the closure for one or two more years may not result in any great increase in stock size because the juveniles that were most affected by the cold kill (as well as the largest, most reproductively important individuals in the population) are already protected by the slot limit.

If no management action is taken, the EO will expire on August 31 and the Gulf stock will re-open on September 1, 2013, and return to the regular season structure.

The next FWC assessment is scheduled to be completed in 2015 if no management changes are made. Between now and the next assessment staff will consider what metric or suite of metrics would more accurately reflect stock status and allow consideration of natural mortality events.

**The following slides are considered back up material
and are not anticipated to be part of the actual
presentation to the Commission**



Distribution and Biology

- Common in the Gulf of Mexico and Atlantic
- Common in nearshore and estuarine waters
- Genetic studies show separate stocks occur in Florida
- Live up to 21 years, grow to a maximum of 48 inches, and weigh a maximum of 38 pounds
- Eat shrimp and fish
- Spawn April through October



Snook are common in nearshore and estuarine waters along the Atlantic coast and in the Gulf of Mexico. Genetic studies have shown two distinct stocks of snook occur in Florida, in the Gulf of Mexico and the Atlantic. They can live up to 21 years, grow to about 48 inches, and weigh up to 38 pounds. Snook eat mostly shrimp and fish. They spawn in Florida from April or May through September or October, depending on the climate. Snook are protandric hermaphrodites meaning the males reverse roles and turn into females between the ages of 1 and 7.